

REMARKS

This amendment is responsive to the Office Action mailed October 17, 2007. Reconsideration and allowance of the claims 2-20 are requested.

The Office Action

The Office Action mailed October 17, 2007 examined claims 1-20.

Claims 1, 3, and 17 stand rejected under 35 U.S.C. § 102(b) as allegedly anticipated by Duerr et al., U.S. Pat. No. 5,467,017 (hereinafter "Duerr").

Claims 13-16 stand rejected under 35 U.S.C. § 102(e) as allegedly anticipated by Schulz et al., U.S. Pat. No. 6,870,453 (hereinafter "SchulzReference").

Claims 2, 4-12, and 18-20 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Duerr in view of SchulzReference.

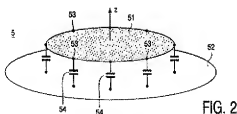
The References

Duerr Figs. 1-3 disclose an open MRI with a planar conductor structure (6) near a first pole (1) which is connected to shielding (4) via capacitors (8, 9). At the opposite pole (2), a planar conductor structure (7) near a the second pole (2) is connected to shielding (5) via capacitors (10, 11). Duerr col. 3 lines 30-40. The capacitive connections (8, 9, 10, 11) connect the respective RF shields (4, 5) to the respective planar conductor structures (6, 7) to provide current return paths. Duerr col. 4 lines 40-42. However, Duerr recognizes that using the shielding as the current return path can compromise the effectiveness of the shielding. Duerr col. 4 lines 31-38. This is because the current (including the return current) is at RF frequency and hence the shielding, which is intended to block RF radiation, can instead act as an RF radiator.

Accordingly, with reference to Fig. 4 Duerr discloses an alternative embodiment in which a separate return conductor plate (40) is provided. Duerr col. 4 lines 40-52. As seen in Fig. 4, this separate return conductor plate (40) is distinct from the shield (4) and is disposed between the planar conductor structure (6) and the RF shield (4). Thus, the resonator of Duerr includes either the RF screen (4) [Figs. 1-3] or a separate conductor (40) [Fig. 4]. In either case, the resonator is not planar, but rather

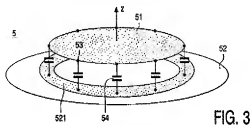
includes a return current path (the screen (4) or the separate return conductor plate (40)) which is not coplanar with the planar conductor structure (6).

SchulzReference discloses a structure similar to that of Duerr Fig. 4. SchulzReference Fig. 2 shows a planar conductor (51) spaced apart from the annular conductor (52) which serves as the return path. ShultzReference expressly states what is shown in Fig. 2, namely that these two conductors (51, 52) are spaced apart from one another rather than having a coplanar relationship – indeed, SchulzReference specifies a preferred separation of approximately 2-3 centimeters. SchulzReference col. 5 lines 32-42.



SchulzReference Fig. 2

SchulzReference Fig. 3 also discloses a resonator analogous to the first embodiment of Duerr, in which the return current conductor (52) is integrated with or synonymous with the RF shield (521). SchulzReference col. 7 lines 5-13.



SchulzReference Fig. 3

Neither Duerr nor SchulzReference recognize the possibility that a wholly planar resonator can be formed by having a central conductor surrounded by a coplanar conducting ring connected together by capacitors arranged radially around the central conductor and connecting the central conductor to the conducting ring.

**The Claims Present Patentable Subject Matter
and Should Be Allowed**

Claim 8 has been placed into independent form including the limitations of canceled base claim 1. Claims 2-7 and 9-12 are now dependent directly or indirectly from claim 8.

Claim 8 calls for an MRI apparatus including a first, planar resonator disposed between one of the pole pieces and the examination zone, arranged substantially in a first common plane, the first resonator including a first conductor in the first common plane, a first conducting ring in the first common plane surrounding the first conductor, and a first plurality of capacitors arranged radially around the first conductor and connecting the first conductor to the first conducting ring; and a first RF screen disposed between the first pole piece and the first resonator.

Neither Duerr nor SchulzReference, nor their combination, disclose this arrangement. Both references disclose two embodiments.

In the first embodiment (Duerr Figs. 1-3 and SchulzReference Fig. 3) the resonator incorporates the radio frequency shield as the current return path. In contrast, claim 1 calls for a first conductor ring connected with the first conductor, and a separate and distinct RF screen. Moreover, in the first embodiment of Duerr and SchulzReference the resonator is not planar – rather, the return current path of the resonator is provided by the RF shield which is offset from the planar conductor.

In the second embodiment (Duerr Fig. 4 and SchulzReference Fig. 2) the resonator does have a conductor distinct from the RF shield to provide the current return path of the resonator. However, again the resonator is not planar. Both Duerr and SchulzReference disclose the second conductor providing the resonator current return as being arranged spaced apart from the first conductor, and not in a common plane surrounding the first conductor as called out in claim 8.

The present application (not Duerr and not ShulzReference) recognizes that it is both feasible and advantageous to place the current return path in the same common plane as the first conductor:

Moving the annular ring 32 farther away from the RF screen 28 than in previous embodiments improves decoupling the ring from the screen and improves sensitivity. It is advantageous to maintain both the circular plate

30 and the annular ring 32 as far from the RF shield 28 as possible. The planar approach optimizes this displacement without encroaching on and reducing the size of the examination zone.

Present application at page 4, 2nd full paragraph.

Although Duerr and ShulzReference recognize an advantage in having a return conductor separate from the RF shield, neither reference recognizes that this return conductor can be arranged coplanar with the central conductor.

Based at least on the foregoing, claim 8 is respectfully submitted to set forth patentable subject matter, and accordingly Applicants respectfully request allowance of claims 2-12.

Claim 13 calls for a resonator comprising a round central conductor, an annular ring surrounding and in the same plane as the central conductor, a plurality of rungs arranged radially between the central conductor and the annular ring and in the same plane as the central conductor and the annular ring, and a plurality of capacitors disposed in the rungs.

Each of Duerr and ShultzReference disclose a round central conductor and an annular ring connected with the round central conductor by rungs having capacitors. However, neither Duerr nor ShulzReference disclose the annular ring being in the same plane as the central conductor. Further, neither Duerr nor ShulzReference disclose the rungs being arranged radially in the same plane as the round central conductor and the annular ring. Rather, in Duerr and ShultzReference teach an annular conductor that is offset from the round central conductor, rather than being in the same plane. Both Duerr and ShulzReference further teach rungs which are not arranged radially and which are not in the same plane as either the round central conductor or the annular ring. Rather, the rungs of Duerr and ShulzReference span the offset between the round central conductor or the annular ring.

Based at least on the foregoing, claim 13 is respectfully submitted to set forth patentable subject matter, and accordingly Applicants respectfully request allowance of claims 13-16.

Method **claim 17** calls for mounting a planar central conductor of a resonator adjacent and displaced from an RF screen, mounting an annular ring coplanar with the planar central conductor and surrounding the central conductor, and

connecting the central conductor to the annular ring with a plurality of capacitors arranged radially. Both Duerr and ShulzReference teach to the contrary, calling for either connecting the central conductor directly to an RF shield that is itself not arranged coplanar with the central conductor, or connecting the central conductor with an annular ring not arranged coplanar with the central conductor.

Based at least on the foregoing, claim 17 is respectfully submitted to set forth patentable subject matter, and accordingly Applicants respectfully request allowance of claims 17-20.

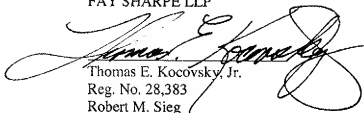
CONCLUSION

For the reasons set forth above, it is submitted that all claims distinguish patentably over the references of record and meet all statutory requirements. An early allowance of claims 2-20 is requested.

In the event the Examiner considers personal contact advantageous to the disposition of this case, he is requested to telephone Thomas Kocovsky at (216) 861-5582.

Respectfully submitted,

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